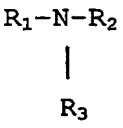
Having thus described the preferred embodiment, the invention is now claimed to be:

1. A method of deactivating a pathogenic chemical agent characterized by:

subjecting the pathogenic chemical agent to a peroxide and a nitrogen containing compound of the general formula:



where R_1, R_2, and R_3 independently are selected from H and an alkyl group.

2. The method as set forth in claim 1, further characterized by:

the peroxide including hydrogen peroxide.

3. The method as set forth in claim 1 or 2, further characterized by:

the peroxide being in the form of a vapor.

4. The method as set forth in claim 3, further characterized by:

vaporizing a liquid peroxide compound to form a peroxide vapor.

5. The method as set forth in any one of claims 1-4, further characterized by:

the nitrogen containing compound being in the form of a gas.

6. The method as set forth in claim 1, further characterized by:

the nitrogen containing compound including ammonia.

7. The method as set forth in claim 1, further characterized by:

the nitrogen containing compound including an alkyl amine.

8. The method as set forth in any one of claims 1-7, further characterized by:

a ratio of the peroxide compound to the nitrogen containing compound being between 1:1 and 1:0.0001.

9. The method as set forth in claim 8, further characterized by:

the ammonia gas and the hydrogen peroxide vapor being present in a ratio of between 1:1 and 0.0001:1.0.

10. The method as set forth in any one of claims 1-9, further characterized by:

the nitrogen containing compound and peroxide being in the form of a gaseous mixture.

11. The method as set forth in claim 10, further characterized by:

the nitrogen containing compound being at a concentration of at least 1 ppm in the gaseous mixture.

12. The method as set forth in claim 11, further characterized by:

the nitrogen containing compound concentration being less than about 100 ppm.

13. The method as set forth in claim 12, further characterized by:

the nitrogen containing compound concentration being at least about 3 ppm in the gaseous mixture and less than about 20 ppm.

14. The method as set forth in claim 13, further characterized by:

the nitrogen containing compound including ammonia at a concentration of about 8 ppm.

15. The method as set forth in any one of claims 10-14, further characterized by:

the peroxide being at a concentration of at least 50 ppm in the gaseous mixture.

16. The method as set forth in any one of claims 10-15, further characterized by:

the peroxide being at a concentration of less than 1000 ppm in the gaseous mixture.

17. The method as set forth in claim 16, further characterized by:

the peroxide being at a concentration of at least 400-800 ppm in the gaseous mixture.

18. The method as set forth in claim 17, further characterized by:

the nitrogen containing compound including ammonia at a concentration of from about 3-20 ppm.

19. The method as set forth in claim 18, further characterized by:

the temperature being about 23-25°C.

20. The method as set forth in claim 18 or 19, further characterized by:

the peroxide including hydrogen peroxide at a concentration of about 600 ppm in the gaseous mixture.

21. The method as set forth in claim 20, further characterized by:

the nitrogen containing compound including ammonia at a concentration of about 8 ppm in the gaseous mixture.

22. The method as set forth in any one of claims 15-21, further characterized by:

the peroxide concentration being at least about 200 ppm in the gaseous mixture.

23. The method as set forth in any one of claims 10-22, further characterized by:

the gaseous mixture further including a carrier gas.

24. The method as set forth in claim 23, further characterized by:

the carrier gas including air.

25. The method as set forth in any one of claims 1-24, further characterized by:

the chemical agent including at least one of G-type, V-type, and H-type chemical agents, and combinations thereof.

26. The method as set forth in claim 25, further characterized by:

the chemical agent including a G-type chemical agent and the method including contacting the pathogenic chemical agent with the nitrogen containing compound and peroxide for sufficient time to reduce the G-type agent to a level of less than 1% of its original concentration.

27. The method as set forth in claim 25 or 26, further characterized by:

the contacting time being up to about six hours.

28. The method as set forth in any one of claims 1-27, further characterized by:

maintaining the temperature during the step of subjecting at from about 15°C to about 30°C.

29. The method as set forth in any one of claims 1-28, further characterized by:

the nitrogen containing compound being a liquid and the method further including vaporizing the liquid in a vaporizer.

30. An apparatus for deactivating a pathogenic chemical agent characterized by:

means **(20, 32)** for subjecting the pathogenic chemical agent to a mixture of a strong oxidant compound and an alkaline compound, both in a gaseous form.

31. The apparatus as set forth in claim 30, further characterized by:

the subjecting means including:

a vaporizer for vaporizing a peroxide liquid,

a supply **(32)** of a nitrogen-containing compound, and

a mixing region **(30)** for mixing the nitrogen containing compound and vapor.

32. The apparatus as set forth in claim 31 further characterized by:

means **(24)** for injecting hydrogen peroxide to the vaporizer at a rate of 0.4-0.5 grams/minute.

33. The apparatus as set forth in claim 31 or 32, further characterized by:

the mixing region being at the entrance of an enclosure **(10)** in which the pathogenic chemical agent is disposed.

34. The apparatus as set forth in claim 33, further characterized by:

a liquid hydrogen peroxide source for supplying liquid hydrogen peroxide to the vaporizer, and

the supply **(32)** of nitrogen containing compound including a compressed ammonia gas tank.

35. The apparatus as set forth in claim 34, further characterized by:

a control means **(24, 34)** which controls a rate of supplying the hydrogen peroxide to the vaporizer and a rate of supplying the ammonia gas to achieve a peroxide vapor to ammonia vapor ratio between 1:1 and 1:0.0001.

36. The apparatus as set forth in claim 34 or 35, further characterized by:

a control means **(24, 34)** which controls a rate of supplying the hydrogen peroxide to the vaporizer and a rate of supplying the ammonia gas to form a mixture in which a concentration of ammonia is at least 1ppm.

37. The apparatus as set forth in any one of claims 30-36, further characterized by:

the nitrogen containing compound including a liquid, and further characterized by:

a mister **(30)** for forming a mist of the liquid nitrogen containing compound.

38. The apparatus as set forth in any one of claims 31-37, further characterized by:

a chamber **(10)** connected with the mixing region for receiving items contaminated with the pathogenic chemical agent.

39. The apparatus as set forth in any one of claims 30-38, further characterized by:

the subjecting means including:

a means **(50)** for atomizing or vaporizing an alkaline liquid to form the nitrogen containing compound.

40. The apparatus as set forth in claim 39, further characterized by:

a peroxide vaporizing means **(20)** which generates a vapor or mist containing the peroxide; and

a chamber **(10)** connected with the atomizing or vaporizing means for receiving the vapor or mist.

41. A method for decontamination of an item contaminated with GD, the method characterized by:

contacting the item in an enclosure **(10)** with a vapor containing a peroxide and ammonia for sufficient time to reduce the concentration of GD to less than about 1% of its initial concentration, the time for the concentration to reach 1% of its initial concentration being less than 6 hrs.

42. A method of deactivating a pathogenic chemical agent characterized by:

forming a peroxide vapor;

increasing the pH of the vapor with a pH-increasing compound;

subjecting the pathogenic chemical agent to the peroxide at the increased pH for sufficient time to deactivate the chemical agent.

43. The method as set forth in claim 42, further characterized by the peroxide including hydrogen peroxide and the pH-increasing compound includes ammonia.

44. The method as set forth in claim 43, further characterized by the hydrogen peroxide being at a concentration of from about 200-800 ppm and the ammonia is at a concentration of from 3-40 ppm.

45. The method as set forth in claim 44, further characterized by the temperature being at room temperature.

46. A method of deactivating a biologically active substance characterized by:

subjecting the biologically active substance to a mixture of a strong oxidant compound and an alkaline compound, both in a gaseous form.

47. The method as set forth in claim 46, further characterized by:

the alkaline compound in gaseous form including a mist formed by atomizing a liquid alkaline compound.

48. The method as set forth in claim 46 or 47, further characterized by:

the strong oxidant including a peroxy compound.

49. The method as set forth in claim 48, further characterized by:

vaporizing a liquid peroxy compound to form a peroxy vapor.

50. The method as set forth in any one of claims 46-49, further characterized by:

the alkaline compound including at least one of ammonia and a short chain alkyl amine.

51. The method as set forth in any one of claims 46-50, further characterized by:

the peroxy compound including hydrogen peroxide.

52. The method as set forth in any one of claims 46-51, further characterized by:

the biologically active substance including one or more of chemical agents, pathogens, prions, and biotoxins.

52. The method as set forth in claim 52, further characterized by:

the biologically active substance including G-type nerve agents.

53. The method as set forth in claim 52, further characterized by:

the ammonia gas and the hydrogen peroxide vapor being present in a ratio of between 1:1 and 0.0001:1.0.